



NASA Biological Diversity & Ecological Conservation (BDEC) Newsletter

NASA Headquarters
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Washington, D.C. 20546
<https://cce.nasa.gov/biodiversity>

2022-12-31

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A New Name & New Opportunity! Earth Science Applications: Ecological Conservation

Proposal Deadline: 2023-04-13

Solicitation briefing: 2023-01-13 from 1400-1600 ET

Link to NSPIRES solicitation: <https://bit.ly/nasa-ecol-open>

New call for projects providing evidence-based decision support for conservation and management in three topical areas:

- **Combatting invasive species spread**
- **Advancing use of ecosystem services in decision making**
- **Establishment, management, or protection of protected areas**



Image credit: Conservation International; John McCormack. QR code: NSPIRES announcement for funding opportunity.

Formerly called *Ecological Forecasting*, the Earth Science Division Applied Sciences Program's Ecological

Conservation Application Area seeks proposals that will begin at an ARL 5 and achieve sustained use by end user organizations (i.e., ARL 9). Please join us online on January 13th, 2023, at 1400 ET for a solicitation briefing. Direct questions to Keith Gaddis or Woody Turner. Webinar link details can be found on the NSPIRES opportunity page.

Prospective proposers should note that NASA is *waiving the cost share requirement* for end users primarily representing indigenous or tribal organizations and/or organizations primarily focused on serving the interests of underserved communities.



2022 Highlights

-Keith Gaddis & Woody Turner

2022 was an exciting and fruitful year for NASA, the NASA Earth Science Division, and its Biological Diversity and Ecological Conservation (BDEC) program elements.

December 16th, 2022, the international SWOT (Surface Water and Ocean Topography) mission successfully launched from Vandenberg AFB ([SWOT launch press release](#)). Early data are already being transmitted to Earth, and after the 6-month commissioning period, will provide key information about large water bodies, including availability and distribution, as well as fine details of ocean topography. Follow SWOT mission updates, science advances, applications, and data releases at <https://nasa.gov/swot>.

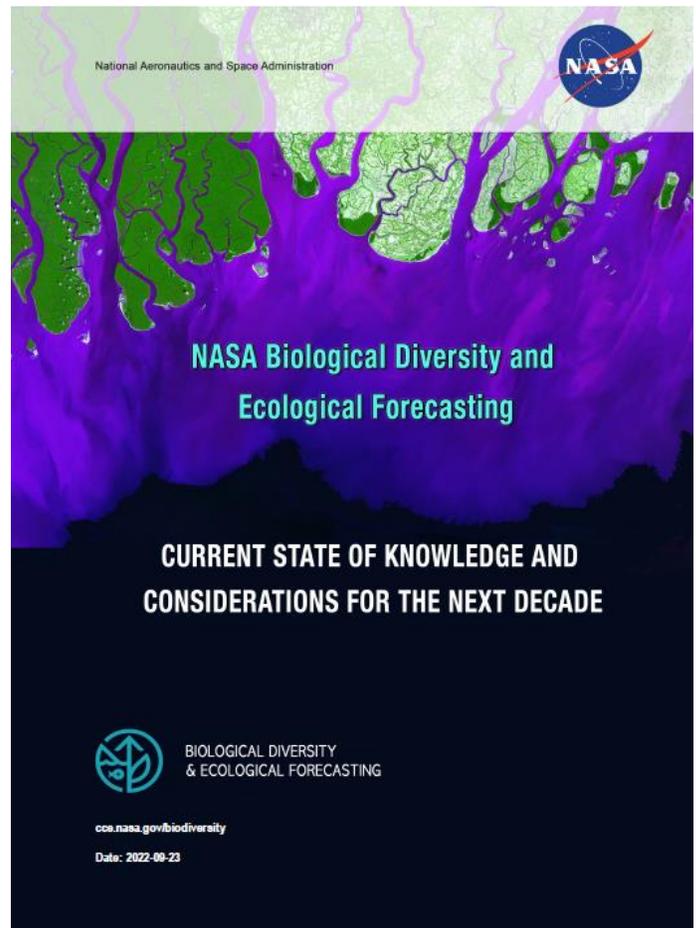
In 2022, thirteen new projects joined the BioSCape Airborne Campaign Science Team to better understand biodiversity within the ecologically important Greater Cape Floristic Region of South Africa under the A.7 Biodiversity: Marine, Freshwater, and Terrestrial Biodiversity Survey of the Cape. For campaign details or updates, visit: <https://espo.nasa.gov/bioscape>. The upcoming [NASA Carbon Cycle & Ecosystems \(CC&E\) Joint Science Workshop in 2023](#), in College Park, MD, will bring together members of four research program elements (Land-Cover and Land-Use Change, Ocean Biology and Biogeochemistry, Terrestrial Ecology, and Biological Diversity) and their Applied Sciences counterpart program, the Ecological Conservation Application Area.

We look forward to 2023 and the continued science advances and science applications by the entire BDEC community!

Biological Diversity and Ecological Forecasting Report

-Gary Geller

The NASA Biological Diversity and Ecological Conservation program elements have released a detailed report on the value of remote sensing for understanding, monitoring, and forecasting biodiversity and supporting decision making. Developed by a working group of experts, the report demonstrates the value of remote sensing for biodiversity and ecological forecasting while exploring new ideas and identifying potential program opportunities for the next decade. The full report is at: <https://cce.nasa.gov/biodiversity/pdf/NASABiodiversityReport2022.pdf>.



Publication Highlight



Newly Discovered Genetically and Functionally Distinct Subpopulation of *Ursus maritimus* in Greenland

DOI: 10.1126/science.abk2793

Kristin Laidre (Polar Science Center, University of Washington) and others reported on a newly discovered subpopulation of polar bear (*Ursus maritimus*). Laidre and colleagues combined 36 years of movement, genetic, and demographic data to show that polar bears in Southeast Greenland are distinct from bears living elsewhere along the island's eastern coast. Their findings were published in the June 17 issue of *Science* as the featured cover story (source: [NASA Earth Observatory press release](#)).

This work was sponsored by NASA the Biological Diversity and Ecological Forecasting programs and NASA Cryospheric Sciences (awards NNX11AO63G, NNX13AN28G, 80NSSC18K1229).

First in-person annual team meeting in three years!

In September 2022, the Biological Diversity and Ecological Conservation (formerly Ecological Forecasting) team met at The Hotel in College Park, MD. 140 team members attended the 3-day meeting in person, with an additional 309 attending virtually. The meeting comprised oral sessions, lightning sessions, poster presentations, workshops, demonstrations of decision support tools, and a mentor-mentee luncheon. Please [visit the meeting homepage](#) for links to team meeting talks. We thank everyone who attended and look forward to the CCE Joint Science Workshop in 2023.



New Faces in 2022

Biological Diversity and Ecological Conservation programs gained a few new people in 2022!

Associate Program Manager, Celio Sousa

NASA Goddard Space Flight Center scientist Celio Sousa (top right) joined the Ecological Conservation Program as an Associate Program Manager in 2022 to assist during Laura Roger's detail in NASA Earth Science Division. Dr. Sousa is a leading expert in ecosystem extent mapping using multi-spectral, longitudinal data. In addition to using sensor data to characterize and quantify land cover extent and change, Dr. Sousa also studies the impacts of such changes on the biophysical and socio-economic properties of social-ecological systems. In 2023, Dr. Sousa will continue his role as an associate by leading the program's efforts surrounding Natural Capital and Ecosystem Accounting.



AAAS Science & Technology Policy Fellows, Drs. Amanda Koltz & Jessica Burnett

In September 2022, BDEC onboarded two AAAS Science & Technology Policy Fellows (STPF), Drs. Amanda Koltz (middle right) and Jessica Burnett (bottom right).

Dr. Amanda Koltz (middle right) is an ecologist with expertise in the links between community, ecosystem, and global change ecology. She is supporting the Biological Diversity and Terrestrial Ecology programs. In this role, Amanda is excited to help expand opportunities for the use of Earth observations data in Ecology and to support NASA's interagency and international activities. Amanda's past research has focused on understanding the consequences of changing species interactions for ecosystem functioning in rapidly changing ecosystems. She joins us from Washington University in St. Louis, where she was previously a Senior Scientist in the Department of Biology. Amanda is mentored by Keith Gaddis, Woody Turner, Hank Margolis, and Mike Falkowski.



Dr. Jessica Burnett (bottom right) is a wildlife ecologist with expertise in population parameter estimation, scientific programming, open science, and avian ecology. She supports the Ecological Conservation program and has a deep interest in advancing the use of remotely sensed and other NASA data by government and non-governmental wildlife organizations. Dr. Burnett joins us from the U.S. Geological Survey, where she was a Research Ecologist and Mendenhall Postdoctoral Fellow in Core Science Systems Science Analytics and Synthesis, and the Eastern Ecological Science Center (Patuxent Wildlife Research Center). She is mentored by Keith Gaddis and Woody Turner. *For more information on the AAAS Science & Technology Policy Fellowship, please visit <https://www.aaaspolicyfellowships.org/>.*



Project Highlight: Ecosystem Accounting



Piloting the Use of Earth Observation Data in Support of National and Subnational Ecosystem Accounts in the United States

PI: Austin Troy, University of Colorado Denver

Dr. Troy is a Professor in the Department of Urban and Regional Planning at the University of Colorado Denver, Principal and Co-Founder of [Spatial Informatics Group](#), and was PI on the recently completed NASA Ecological Forecasting project titled, "Piloting the Use of Earth Observation Data in Support of National and Subnational Ecosystem Accounts in the United States." This project piloted the development of several natural capital accounts (NCAs) and related tools in support of the Group on Earth Observation Initiative, "Earth Observation for Ecosystem Accounting." Using Earth Observation data, two accounts (see publications below) were piloted for the continental U.S.: one estimating ecosystem services from urban trees (rainfall interception and heat mitigation) and the other estimating services from crop pollination. Ecosystem accounts estimate the economic value of ecosystem service, how values are changing over time, the way ecosystems provide the services, and how user groups benefit from them. Several supporting products and data sets were created in support of these accounts, all relying heavily on NASA Earth Observations data.



This work is timely as the U.S. continues to develop a [Federal Strategic Plan on Statistics for Environmental-Economic Decisions](#), which is poised to incorporate key Ecosystem Services frameworks, like the [United Nation's System of Environmental-Economic Accounting](#) (UN-SEEA). Earth Observations will play a critical role in these efforts. This work was supported by NASA awards: 80NSSC18K0341S001 and 80NSSC18K03.



Relevant publications and datasets produced from these awards include:

<https://doi.org/10.5066/P9J2Y1WG>

<https://doi.org/10.1016/j.ecoser.2020.101226>

<https://www.mdpi.com/2072-4292/14/5/1219>

<https://doi.org/10.1038/s41597-020-00585-0>

<https://doi.org/10.1016/j.ecoser.2020.101226>

<https://doi.org/10.5066/P9J2Y1WG>

Images of project team members, Austin Troy, PI (top), Ken Bagstad, Co-PI (middle; U.S. Geological Survey), and Mehdi Heris, postdoctoral researcher (bottom; Dr. Heris is now an Assistant Professor at CUNY).

FINESST Investigator Highlights

Yilun Zhao, M.Sc.

Ph.D. Student, University of Illinois, Urbana-Champaign



Yilun Zhao, M.Sc. is a first year FINESST recipient at the University of Illinois advised by Dr. Chunyuan Diao. Zhao's FINESST project aims to investigate the impacts of biocontrol treatments of the noxious weed, Tamarisk (*Tamarix* species), on riparian plant biodiversity of the Colorado River. To achieve this aim, Zhao's project is grouped into three parts. First, the COLD (Continuous monitoring of Land Disturbance) model will be used to detect *Tamarix* spp. defoliation and regrowth, and to understand relationships with beetle species of genus *Diorhabda*. Next, changes to local- and landscape-level biodiversity caused by the *Tamarix* species biocontrol program will be evaluated with convolutional autoencoder (CAE) time series clustering model. Finally, Zhao will investigate the relative effects of pre-biocontrol biodiversity, soil water content, and soil salinity on post-treatment biodiversity levels.

FINESST student investigators Yilun Zhao (above) and Jenna Keany (below).



Jenna Keany

Ph.D. Student, Northern Arizona University

Jenna Keany is a second year FINESST recipient at NAU, advised by Dr. Christopher Doughty. Jenna's research uses NASA lidar data from LVIS and GEDI to quantify how critically endangered African forest elephants impact canopy structure. "By determining how they change the structure of African tropical forests through the creation of trails and dispersing the seeds of more carbon dense trees, we can understand how forest elephants act as ecosystem engineers," Jenna Keany explains.

Keany's research interests include impacts of megafauna on forest structural dynamics, and enjoys teaching, mentoring, and promoting women in STEM. Seeking a career in academia, Jenna seeks to continually bridge the gap between the remote sensing and conservation biology communities through technical workshops and community conservation. To achieve this aim, Keany recently led a hands-on workshop at AGU (December 2022) titled, "Studying Forest Structure from Space: An Introduction to GEDI Lidar Data Preprocessing and Analysis in Ecological Applications."

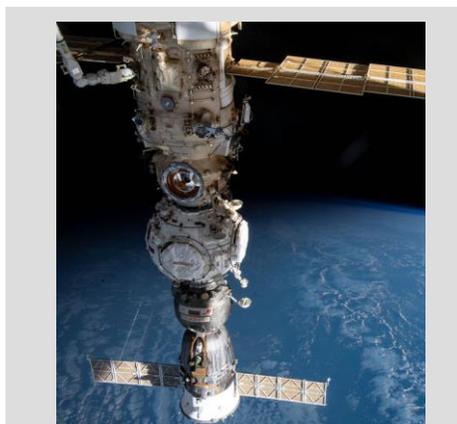
Products relevant to Jenna's FINESST award (80NSSC21K1636) can be found at <https://scholar.google.com/citations?user=Ahr03FwAAAAJ&hl>.

Requests for Information



National Nature Assessment

NASA sits on the interagency Federal Steering Committee that is developing a National Nature Assessment (NNA) for the U.S. The committee has published a request for information (RFI) to help inform the framing, development, and use of the Assessment. Please visit <https://www.globalchange.gov/nna> for the RFI, a link to the Federal Register Notice, and a short video introduction to the NNA. The RFI is open until March 31, 2023.



Request for Newsletter Content

Please visit <https://bit.ly/bdec-newsletter> to provide project updates to be featured in the next newsletter. We welcome news, updates, or comments on published or forthcoming papers, reports, media, software, or events. Contact Jessica Burnett (jessica.burnett@nasa.gov) or Amanda Koltz (amanda.koltz@nasa.gov) with questions.

Useful Links

[Our homepage](#)

[Open funding opportunity: A.40: Earth Science Applications: Ecological Conservation](#)

[Newsletter archive](#)



NASA Earth Science Division earth-orbiting fleet (version as of 2022-12-01).

Recent Publications

- Anhalt-Depies, C., Berland, M., Rickenbach, M.G., Bemowski, R. and Rissman, A.R., 2022. Use of latent profile analysis to characterise patterns of participation in crowdsourcing. *Behaviour & Information Technology*, pp.1-9.
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